TITLE OF THE INVENTION

Communication Terminal

BACKGROUND OF THE INVENTION

The present invention relates to a communication terminal. More particularly, the present invention relates to a cellular phone capable of receiving a TV program.

The conventional TV system connectable to a network adopts a technique whereby, in order to prevent the seeing and hearing of a TV program from being obstructed, the TV system displays an email-arrival-displaying screen showing detected arrivals of emails, which have been received while the user of the TV system is watching the TV program, after a program scene has been replaced by a commercial screen. This technique is disclosed for example in Japanese Patent Laid-open No. 2002-288084 serving as patent reference 1.

In accordance with the technique disclosed in patent reference 1, however, arrivals of phone calls and emails, which are received while the user is watching a TV program, are reported later without considering factors such as the priorities of the phone-call maker, the email sender and the TV program. That is to say, even though an incoming phone call or an incoming email is received while the user

is watching the TV program, it is desirable to let the incoming phone call or the incoming email take precedence of a TV program being watched if the incoming phone call is made by an important caller or the incoming email has been sent by an important email sender and/or TV the program is not of much importance. Thus, although the TV program is not so significant as the incoming phone call or the incoming email, the user is not immediately informed of the arrival of the phone call or the email. In other words, if a TV program is not of importance to the user in comparison with an incoming phone call or an incoming email, it is desirable to inform the user of the arrival of the phone call or the email in accordance with the priority of the phone call or the priority of the email even if the phone call or the email is received while the user is watching the TV program.

In addition, the disclosed technique does not consider a feature of informing the phone-call maker of the end time of the TV program. Thus, the phone-call maker does not know when the TV program will end, allowing a received phone call to be accepted. As a result, in some cases, the phone-call maker needs to make a phone call again and again several times till the TV program watched

by the user serving as the phone-call target is ended, giving rise to a trouble. If the phone-call maker is informed of the end time of the TV program in such a case, the trouble can be avoided, providing the phone-call maker and the phone-call target with convenience.

It is thus an object of the present invention addressing the problems described above to provide a communication terminal offering much convenience to the phone-call maker and the phone-call target.

SUMMARY OF THE INVENTION

In order to achieve the object described above, the present invention provides a communication terminal comprising:

a video reproduction means for carrying out a video reproduction;

a communication means for carrying out a communication;

a storage means for storing an incoming-reporting condition indicating whether a video reproduction takes precedence of an operation to report an incoming or the operation to report an incoming takes precedence of the video reproduction; and

a setting means for setting the incoming-reporting condition,

wherein, in the event of an incoming in the course of a video reproduction carried out by the video reproduction means, the incoming is reported in accordance with the incoming-reporting condition.

In accordance with the present invention, it is thus possible to provide a communication terminal offering much convenience to the user.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a diagram showing the configuration of a communication terminal provided by the present invention;

Fig. 2 shows a first flowchart representing a sequence of operations carried out to handle an incoming arriving in the course of a video reproduction;

Fig. 3 shows a second flowchart representing a sequence of operations carried out to handle an incoming arriving in the course of a video reproduction;

Fig. 4 is a diagram showing a first typical table of concrete incoming-reporting conditions;

Fig. 5 shows a flowchart representing a procedure for referencing the table of incoming-reporting conditions;

Fig. 6 is a diagram showing a first sequence of operations carried out by an incoming-side terminal, an outgoing-side terminal and a base station;

Fig. 7 is a diagram showing a second sequence of operations carried out by an incoming-side terminal, an outgoing-side terminal and a base station;

Fig. 8 is a diagram showing a second typical table of concrete incoming-reporting conditions;

Fig. 9 is a diagram showing a screen appearing on a display unit to reveal the arrival of an incoming in the course of watching a TV program;

Fig. 10 is a diagram showing a screen appearing on a display unit to reveal an email received by a phone-conversation partner;

Fig. 11 is a diagram showing a screen appearing on a display unit to reveal the fact that an email has been transmitted to a phone-conversation partner;

Fig. 12 is a diagram showing a first screen for setting incoming-reporting conditions;

Fig. 13 is a diagram showing a second screen for setting incoming-reporting conditions;

Fig. 14 is a diagram showing a third screen for setting incoming-reporting conditions; and

Fig. 15 is a diagram showing a fourth screen for setting incoming-reporting conditions.

PREFERRED EMBODIMENTS OF THE INVENTION

Fig. 1 is a diagram showing the configuration of a communication terminal 10. The communication terminal 10 is typically cellular phone or a PDA. As shown in the figure, the communication terminal 10 comprises a network communication unit 11, a TV-use communication unit 12, a audio input/output unit 13, a control unit 14, a storage unit 15, a key input unit 16, a display unit 17 and an end-time acquisition unit 18.

Connected to a radio or wired communication line, the network communication unit 11 is a component for communicating a service such as a phone call and data such as an email and a wave. In addition, the network communication unit 11 has a modulation means for modulating data to be transmitted and a demodulation means for demodulating received data. The modulation and demodulation means themselves are not shown in the figure though. The TV-use communication unit 12 is a component for receiving a TV broadcast such as an analog or digital broadcast transmitted through a radio or wired

communication. The TV-use communication unit 12 includes a

demodulation means for demodulating a received signal.

This demodulation means is also not shown in the figure.

The audio input/output unit 13 comprises an audio input

unit such as a microphone and an audio output unit such as

a speaker. The audio input unit is a component for

converting an input sound or a voice into a signal. On the

other hand, the audio output unit is a component for

generating a sound or a voice. The control unit 14 is a

component for controlling the whole communication terminal

10. To be more specific, the control unit 14 controls

other components including the network communication unit

11, the TV-use communication unit 12, the audio

input/output unit 13, the storage unit 15, the key input

unit 16, the display unit 17 and the end-time acquisition

unit 18. The storage unit 15 is a memory used for storing

programs, voices, sounds, images, emails, waves and other

user data. The storage unit 15 can be a memory embedded in

the communication terminal 10 or an external memory such as

a removable memory card. The key input unit 16 is a

component comprising the ten keys, function keys and other

buttons to be operated by the user for entering inputs to

the communication terminal 10. The display unit 17 is a

display screen such as a liquid crystal display screen for displaying an image of a received TV broadcast or a reproduced image. The display unit 17 may comprise a plurality of display screens including a main screen and a sub-screen. The end-time acquisition unit 18 is a component for acquiring the end time of an image or a program being watched. The end-time acquisition unit 18 may also be embedded in the control unit 14.

It is to be noted that the present invention is not limited to the configuration described above. For example, the network communication unit 11 and the TV-use communication unit 12 can also be integrated into a single module instead of being segregated into separated modules. By integrating the network communication unit 11 and the TV-use communication unit 12 into a single module, the communication terminal 10 can be downsized and its cost can hence be reduced.

Fig. 2 shows a first flowchart representing a sequence of operations carried out to handle an incoming arriving in the course of a video reproduction in the communication terminal 10 provided by the present invention. To put it concretely, the figure shows operations wherein, when an audio incoming arrives in the course of a video

reproduction, the communication terminal 10 determines whether or not to report the incoming to the user on the basis of an incoming-reporting condition set in advance. If the incoming is not to be reported to the user, the end time of the video reproduction is transmitted to the phone-conversation partner as a response message. Steps of the operations are explained as follows.

(1) At a step S201, the network communication unit 11 detects an audio incoming. Then, at the next step S202, the control unit 14 determines whether or not a video reproduction is going on at the present time. If the control unit 14 determines that a video reproduction is going on at the present time, the flow of the operation sequence goes on to a step S203. If the control unit 14 determines that a video reproduction is not going on at the present time, on the other hand, the flow of the operation sequence goes on to a step S211 at which the incoming is reported to the user.

In this case, an on-going video reproduction also means an operation being carried out by the user to reproduce and display video information in some forms. The on-going video reproduction typically implies, among others, an on-going operation to display a currently broadcasted TV

broadcast received by the TV-use communication unit 12, an on-going operation to reproduce video information, which was already broadcasted and recorded in advance, and an on-going operation to reproduce an image recorded by the user by using typically a camera embedded in the communication terminal 10. The TV broadcast can be a digital or analog broadcast. If information on the originator of an incoming is displayed or a sound is generated when the incoming is received while an image is being reproduced and displayed, a feeling of eye obstruction or a sense of ear obstruction cannot be avoided so that the user cannot concentrate the attention on the displayed image. Thus, the seeing and hearing of the image are obstructed. In this case, the information on the originator of an incoming includes the phone number of the incoming originator whereas an example of the generated sound is an incoming melody.

(2) As described above, if the determination result obtained at the step S202 indicates that a video reproduction is going on at the present time, the flow of the operation sequence goes on to the step S203 at which the control unit 14 checks an incoming-reporting condition stored in the storage unit 15 to determine whether the video reproduction takes precedence of an operation to

report the incoming to the user or the operation to report
the incoming takes precedence of the video reproduction on
the basis of the setting of the incoming-reporting
condition. If the control unit 14 determines that the
video reproduction takes precedence of the operation to
report the incoming to the user, the flow of the operation
sequence goes on to a step S204. If the control unit 14
determines that the operation to report the incoming to the
user takes precedence of the video reproduction, on the
other hand, the flow of the operation sequence goes on to
the step S211.

If an important telephone-conversation partner is
set in advance as the incoming-reporting condition, for
example, the operation to report an incoming phone call to
the user takes precedence of the video reproduction if the
incoming phone call is made by the important telephone-
conversation partner. Otherwise, the video reproduction
takes precedence of the operation to report the incoming
phone call to the user and the incoming phone call is not
reported, if the incoming phone call is made by a phone-
call maker other than the important telephone-conversation
partner. Thus, if an incoming phone call is received from
an important phone-conversation partner, the operation to

report the incoming phone call to the user takes precedence

of the video reproduction so that the user can answer the

phone immediately.

An important TV program can also be set in advance

as the incoming-reporting condition so that the operation

to reproduce and display the TV program takes precedence of

the operation to report an incoming received while the TV

program is being reproduced and displayed. In this case,

the incoming is not reported to the user. If an incoming

arrives while a TV program other than the important TV

program is being reproduced and displayed, on the other

hand, the operation to report the incoming to the user

takes precedence of the operation to reproduce and display

the other TV program so that the incoming is reported.

Thus, the user can let the operation to reproduce and

display an important TV program take precedence of the

operation to report an incoming to the user so that the

user can enjoy the program without an obstruction to the

seeing and hearing of the program.

As incoming-reporting conditions, in addition to a

phone-conversation partner and a TV program described above,

it is possible to set a variety of conditions such as a

reproduction date/time, a reproduction day of the week, a

reproduction period of time, information on the position of the communication terminal 10, the movement speed of the communication terminal 10, the amount of electric charge remaining in the battery, video attributes, attributes of the telephone-conversation partner and attributes of the program.

For example, a program reproduced during a period of time on a day of the week or a date/time is a favorite drama, movie or the like. In this case, the communication terminal 10 can be used by having an incoming unreported to the user while the favorite drama, movie or the like is being watched during the period of time on the day of the week.

The information on the position of the communication terminal 10 can be obtained from typically a GPS. For example, the communication terminal 10 can be utilized in such a way that, when the communication terminal 10 is used at home, an incoming is always reported to the user since the user can watch a TV program by using an ordinary home TV but, when the communication terminal 10 is used at an outdoor location, on the other hand, an incoming is not reported.

The movement speed of the communication terminal 10

can be found from the positions obtained periodically from the GPS each as the present position of the communication terminal 10. If the movement speed of the communication terminal 10 is at least equal to a predetermined value, the communication terminal 10 determines that the user is currently on board of a public transport facility or driving its own car. In this case, an incoming is not reported to the user since, if an incoming is reported, surrounding passengers in the public transport facility will be disturbed or the safety of the user driving its own car will be at stake. The communication terminal 10 can also be used in such a way that, when the user is on board of a train moving along a railway, the user is allowed to watch a TV program but, when the user is moving along an ordinary road at at least a predetermined speed, on the other hand, neither an incoming is reported to the user nor a TV program can be watched for the sake of safety since the user is determined to be driving a car by itself.

The communication terminal 10 can be used in such a way that, when the amount of electric charge remaining in the battery is small, an incoming is not reported to the user in order to consume the little electric charge remaining in the battery more economically.

With regard to the video attributes, the communication terminal 10 can be used in such a way that, if the image being reproduced is an already recorded image, an incoming is reported to the user since the reproduction of such an image can be suspended temporarily and resumed later to allow the user to watch the rest but, if the image being reproduced is a current TV broadcast, on the other hand, an incoming is not reported because an interrupted portion of the TV broadcast cannot be watched later.

In regard to the attributes of the phone-conservation partner, the communication terminal 10 can be used in such a way that, if the phone-conservation partner is cataloged as a person doing businesses with the user, the phone-conservation partner is regarded as such an important person that an incoming phone call made by the phone-conservation partner is reported to the user. With regard to the video attributes of a program, the communication terminal 10 can be used in such a way that, if the program is a movie, an incoming is not reported to the user so as to prevent the seeing and hearing of the movie from being interrupted.

In addition, the incoming-reporting conditions described above can be set as a combination. For example,

phone-conversation partners are categorized into customers and friends whereas days of the week are classified into weekdays and holidays. In this case, the communication terminal 10 can be used in such a way that, when a phone call is received on a day from a customer, the incoming phone call is reported to the user without regard to whether the day is a weekday or a holiday but, if a phone call is received on a day from a friend, on the other hand, the incoming phone call is not reported to the user if the day is a weekday but reported if the day is a holiday. By allowing a variety of incoming-reporting conditions to be set in this way, the user can have various kinds of setting for the incoming-reporting condition as the user desires.

(3) As described above, if the control unit 14 determines at the step S203 that the video reproduction takes precedence of the operation to report the incoming to the user, the flow of the operation sequence goes on to the step S204 at which the control unit 14 controls the network communication unit 11 to transmit an incoming response request. This incoming response request is a request to connect the communication terminal 10 to the communication terminal of the phone-conversation partner through a network. With the communication terminal 10 connected to

the communication terminal used by the phone-conversation
partner, operations can be carried out at the subsequent
steps to notify the phone-conservation partner of the
program end time to be described later. It is to be noted
that operations of the steps S204 to S208 are carried out
in a background mode not obstructing the video seeing and
hearing carried out by the user to watch an image.

(4) As described above, the incoming response request is
transmitted to connect the communication terminal 10 to the
communication terminal of the phone-conversation partner
through the network at the step S204. Then, at the next
step S205, the end-time acquisition unit 18 acquires the
reproduction end time of the present video reproduction.
For example, the reproduction end time can be picked up
from end times of programs included in broadcasted data of
a digital broadcast, obtained from a server providing
programs or fetched from typically a program table
downloaded in advance by using an EPG function or the like.
In the case of a reproduction of an image recorded in
advance, the reproduction end time can be found from the
recording length of the image.

As explained above, the reproduction end time is
acquired after the incoming response request is transmitted.

It is to be noted that, the reproduction end time can also be acquired before the incoming response request is transmitted.

(5) After the reproduction end time is acquired at the step S205, the control unit 14 converts the reproduction end time into audio data and creates a message including the audio data as a response message to be transmitted to the phone-conversation partner at the next step S206. As an example, the response message states: "The person you called is currently watching a TV program and, thus, cannot answer the telephone. Please, make a phone call again later at a time not earlier than XX minutes past OO." The "XX minutes past OO" is the audio data obtained as a result of the conversion of the acquired reproduction end time. The response message can thus be created by synthesizing the audio data with the rest of the message. The audio data of the rest of the response message has been stored in the storage unit 15 in advance. In this case, the audio data of the rest of the response message states: "The person you called is currently watching a TV program and, thus, cannot answer the telephone. Please, make a phone call again later at a time not earlier than…."

The response message can also simply states :

"Please, make a phone call again later at a time not earlier than XX minutes past OO" without informing the phone-conversation partner that the called person is currently watching a TV program and, thus, cannot answer the telephone.

(6) After the audio data of the response message is created at the step S206, the control unit 14 reproduces a response message based on the audio data and transmits the message to the communication terminal of the phone-conversation partner by way of the network communication unit 11 at the next step S207. The response message is reproduced by executing typically an answer-phone function. As the transmission of the response message is ended, a request for a phone termination is transmitted to cut off the line at the next step S208.

(7) After the processing of the step S208 is ended, at the next step S209, the control unit 14 determines a timing to inform the user of the arrival of the incoming. For example, when the control unit 14 detects a CM image replacing a TV image at the next step S210, the control unit 14 displays a message on the display unit 17 to inform the user that the incoming has been received. In addition, the timing to report an incoming to the user does not have

to be detection of a CM image replacing a TV image. For example, an incoming can also be reported to the user when the user turns off the TV function, changes the channel number, stops the video reproduction or suspends the video reproduction by typically carrying out an operation to enter an input to the communication terminal 10.

An incoming can be reported to the user by typically displaying a message on the display unit 17. The message may state: "An incoming arrived while a TV program was being watched" like one shown in Fig. 9. In this case, the message may include information such as the time and date of the arrival of the incoming, the originator of the incoming and the phone number and email address of the originator. Such information tells the user when the incoming arrived, and allows the user to confirm the phone number and email address of the originator of the incoming as well as make a phone call or send an email in response to the incoming immediately.

The above description has explained a sequence of operations to determine whether or not to report an incoming phone call to the user in accordance with incoming-reporting conditions set in advance and, if the incoming phone call is not to be reported, a message

indicating the end time of a program is transmitted to the phone-conversation partner originating the incoming call.

It is to be noted that, while the above processing is described for an audio incoming, the processing also applies to an incoming email. For example, the communication terminal 10 is used in such a way that, if a video reproduction is going on when an incoming email is received, the control unit 14 checks an incoming-reporting condition stored in the storage unit 15 to determine whether the video reproduction takes precedence of an operation to report the incoming email to the user or the operation to report the incoming email takes precedence of the video reproduction on the basis of the setting of the incoming-reporting condition such as an incoming-reporting condition set to indicate whether or not the email sender is important. If the control unit 14 determines that the video reproduction takes precedence of the operation to report the incoming email to the user, the video reproduction is continued. If the control unit 14 determines that the operation to report the incoming email to the user takes precedence of the video reproduction, on the other hand, the incoming email is reported.

In the sequence of operations shown in Fig. 2, the

incoming-side terminal, the outgoing-side terminal and the base station carry out operations as shown in Fig. 6. To put it in detail, when the outgoing-side terminal makes an origination request, a incoming call is transmitted to the incoming-side terminal by way of the base station. If a video reproduction is going on and takes precedence of the operation to report the incoming email to the user in the incoming-side terminal, the incoming-side terminal transmits an answering incoming call to the outgoing-side terminal by way of the base station. As this incoming response completes a line connection, the incoming-side terminal reproduces and transmits a response message showing the end time of the video reproduction to the outgoing-side terminal. After the response message is reproduced and transmitted, the incoming-side terminal transmits a termination to the outgoing-side terminal by way of the base station as a request reporting a termination of the line connection, and cuts off the line connection.

Next, another sequence of operations is explained by referring to Fig. 3. Fig. 3 shows a flowchart representing a sequence of operations carried out to handle an voice incoming received in the course of a video reproduction.

To put it concretely, in the operations shown in the figure, when an voice incoming is received in the course of a video reproduction, an incoming-reporting condition set in advance is used as a basis for determining whether or not the incoming is to be reported to the user. If the voice incoming is not to be reported to the user, an email showing the end time of the video reproduction is sent to the phone-conversation partner. The sequence of operations shown in Fig. 3 is different from the sequence of operations shown in Fig. 2 in that, in the case of the sequence of operations shown in Fig. 2, the end time of the video reproduction is indicated in a message response while, in the case of the sequence of operations shown in Fig. 2, the end time of the video reproduction is indicated in an email. Operations carried out at steps of the sequence of operations shown in Fig. 3 are explained as follows.

(1) At a step S301, the network communication unit 11 detects an voice incoming. Then, at the next step S302, the control unit 14 determines whether or not a video reproduction is going on at the present time. If the control unit 14 determines that a video reproduction is going on at the present time, the flow of the operation sequence goes on to a step S303. If the control unit 14

determines that a video reproduction is not going on at the present time, on the other hand, the flow of the operation sequence goes on to a step S311 at which the incoming is reported to the user.

In this case, an on-going video reproduction also means an operation being carried out by the user to reproduce and display video information in some forms in the communication terminal 10 as is the case with the sequence of operations shown in Fig. 2.

(2) As described above, if the determination result obtained at the step S302 indicates that a video reproduction is going on at the present time, the flow of the operation sequence goes on to the step S303 at which the control unit 14 checks an incoming-reporting condition stored in the storage unit 15 to determine whether the video reproduction takes precedence of an operation to report the incoming to the user or the operation to report the incoming takes precedence of the video reproduction on the basis of the setting of the incoming-reporting condition. If the control unit 14 determines that the video reproduction takes precedence of the operation to report the incoming to the user, the flow of the operation sequence goes on to a step S304. If the control unit 14

determines that the operation to report the incoming to the user takes precedence of the video reproduction, on the other hand, the flow of the operation sequence goes on to the step S311. Much like the sequence of operations shown in Fig. 2, a variety of incoming-reporting conditions can be set.

(3) As described above, if the control unit 14 determines at the step S303 that the video reproduction takes precedence of the operation to report the incoming to the user, the flow of the operation sequence goes on to the step S304 at which the control unit 14 acquires the email address of the phone-conversation partner. If the phone number of the phone-conversation partner can be used as the email address, the phone number included in the incoming is used as it is. If the email address of the phone-conversation partner has been cataloged on an address list stored in the storage unit 15, the email address is fetched from the list. It is to be noted that operations of the steps S304 to S308 are carried out in a background mode not obstructing the video seeing and hearing carried out by the user to watch the image.

(4) After the email address of the phone-conversation partner is acquired at the step S304, at the next step S305,

the control unit 14 acquires the reproduction end time of

the present video reproduction. The reproduction end time

of the present video reproduction can be acquired by

adoption of the same technique as the sequence of

operations shown in Fig. 2.

As explained above, the reproduction end time is

acquired after the incoming response request is transmitted.

It is to be noted that, the reproduction end time can also

be acquired before the incoming response request is

transmitted.

(5) After the reproduction end time is acquired at the

step S305, the control unit 14 transmits a request for an

end of the call session to the originator of the sound

incoming by way of the network 11 at the next step 306.

(6) As the line is cut off by the transmitted request for

an end of the call session at the step S306, the control

unit 14 starts to create an email informing the phone-

conversation partner of the video-reproduction end time at

the next step S307. Information on the video-reproduction

end time acquired at the step S305 is included typically in

the main body or title of the email. An example of the

main body states: "The person you called is currently

watching a TV program and, thus, cannot answer the

telephone. Please, make a phone call again later at a time
not earlier than XX minutes past OO." The "XX minutes past
OO" is data based on information on the acquired end time
of the video reproduction. The main body of the email can
thus be created by embedding the data based on the
information on the acquired end time of the video
reproduction into the rest of the main body of the email.
The rest of the main body of the email is a fixed phrase
already stored in the storage unit 15 in advance. In this
case, the fixed phrase of the rest of the main body of the
email states: "The person you called is currently watching
a TV program and, thus, cannot answer the telephone.
Please, make a phone call again later at a time not earlier
than."

The main body of the email can also simply states:
"Please, make a phone call again later at a time not
earlier than XX minutes past OO" without informing the
phone-conversation partner that the called person is
currently watching a TV program and, thus, cannot answer
the telephone.

(7) After the email is written at the step S307, the
control unit 14 transmits the email to the communication
terminal of the phone-conversation partner by way of the

network communication unit 11 at the next step S308.

The email sent to the phone-conversation partner is displayed on the display unit employed in the communication terminal of the phone-conversation partner as a message like one shown in Fig. 10. In this message, the phrase stating: "Please, make a phone call again later at a time not earlier than 21:00" is included in both the title and main body of the email, informing the phone-conversation partner of when a next phone call can be made. In addition, information such as the reception date and time of the email, the sender of the email as well as the phone number and email address of the sender can also be shown in the message. The information tells the phone-conversation partner the reception date and time of the email and allows the partner to confirm the phone number and email address of the sender of the email.

(8) After the processing of the step S308 is ended, at the next step S309, the control unit 14 determines a timing to inform the user of the arrival of the incoming. For example, when the control unit 14 detects a CM image replacing a TV image at the next step S310, the control unit 14 displays a message on the display unit 17 to inform the user that the incoming has been received. Much like

the sequence of operations shown in Fig. 2, the incoming

can be reported to the user with a variety of timings.

It is to be noted that, since a transmission of an

email costs money, it is desirable to also information the

user that an email has been transmitted to the phone-

conversation partner by displaying a message on the display

unit 17. Thus, a message like one shown in Fig. 11 is

displayed on the display unit 17 to notify the user that an

incoming arrived while the user was watching a TV program

and that an email has been transmitted to the phone-

conversation partner. The message may state: "An incoming

arrived while a TV program was being watched," and include

the contents of the email sent to the phone-conversation

partner. In this case, the message may include information

such as the time and date of the arrival of the incoming,

the originator of the incoming and the phone number and

email address of the originator. Such information tells

the user when the incoming arrived, and allows the user to

confirm the phone number and email address of the

originator of the incoming and make a phone call or send an

email in response to the incoming immediately. It is to be

noted that, while the message displayed on a single screen

as shown in Fig. 11 notifies the user that an incoming

arrived while the user was watching a TV program and that
an email has been transmitted to the phone-conversation
partner, the message does not have to be displayed in this
way. For example, first, a message is displayed on a
screen to notify the user of only the fact that an incoming
arrived while the user was watching a TV program. Then,
when the user carries out an operation by pressing a button,
for example, the screen is replaced by a message notifying
the user that an email has been transmitted to the phone-
conversation partner. Since the message is split into 2
screens, it is possible to reduce complexity of the screen
as complexity caused by difficult-to-read small characters
appearing on the display unit 17 due to the fact that a
large number of characters must be displayed on a screen at
one time.

If an email address cannot be acquired at the step
S304, an email cannot be sent. In this case, a response
message is generated to inform the phone-conversation
partner of the video-reproduction end time. In this case,
the flow of the operation sequence typically continues from
the step S304 to the step S204 of the flowchart shown in
Fig. 2. Then, the operations of the steps S204 to S208 are
carried out to generate the response message. In this way,

it is possible to inform the phone-conversation partner of the video-reproduction end time.

The above description has explained a sequence of operations to determine whether or not to report an incoming phone call to the user in accordance with incoming-reporting conditions set in advance and, if the incoming phone call is not to be reported, an email indicating the end time of a program is transmitted to the phone-conversation partner originating the incoming call.

It is to be noted that, while the above processing is described for an voice incoming, the processing also applies to an incoming email. For example, the communication terminal 10 is used in such a way that, if a video reproduction is going on when an incoming email is received, the control unit 14 checks an incoming-reporting condition stored in the storage unit 15 to determine whether the video reproduction takes precedence of an operation to report the incoming email to the user or the operation to report the incoming email takes precedence of the video reproduction on the basis of the setting of the incoming-reporting condition such as an incoming-reporting condition set to indicate whether or not the email sender is important. If the control unit 14 determines that the

video reproduction takes precedence of the operation to
report the incoming email to the user, the video
reproduction is continued. If the control unit 14
determines that the operation to report the incoming email
to the user takes precedence of the video reproduction, on
the other hand, the incoming email is reported.

In the sequence of operations shown in Fig. 3, the
incoming-side terminal, the outgoing-side terminal and the
base station carry out operations as shown in Fig. 7. To
put it in detail, when the outgoing-side terminal makes an
outgoing request, a call request is transmitted to the
incoming-side terminal by way of the base station. If a
video reproduction is going on and takes precedence of the
operation to report the voice incoming to the user in the
incoming-side terminal, the incoming-side terminal makes a
request to cut off the transmission line and the incoming-
side terminal informs the outgoing-side terminal through
the base station that the transmission line has been cut
off. After the transmission line is cut off, the incoming-
side terminal makes a request to transmit an email
notifying the outgoing-side terminal of a video-
reproduction end time. Then, the outgoing-side terminal
sets a line connection with the base station (a server) to

transmit an acknowledgment of the received email to the incoming-side terminal. It is to be noted that, in this case, there are actually two conceivable cases. In one of the cases, the base station merely passes on the email itself to the outgoing-side terminal. In the other case, the base station gives an acknowledgment of the email to the incoming-side terminal and, later on, the outgoing-side terminal sets a line connection with the base station (a server) to receive the email.

By referring to the flowcharts shown in Figs. 2 and 3, the above description has explained processing carried out to handle an incoming received in the course of a video reproduction. By carrying out the processing, the user can receive a report of an incoming even in the course of a video reproduction in dependence on the importance of the incoming relative to the video reproduction. If the incoming phone call is made by an important partner so that the operation to report the incoming phone call to the user is more significant than the continuation of the video reproduction, for example, the user can answer the telephone. If the incoming phone call is made by a less important partner so that the operation to report the incoming phone call to the user is less significant than

the continuation of the video reproduction, on the other hand, the operation to report the incoming phone call does not take precedence of the continuation of the video reproduction. In this case, the user can enjoy the watching of the program by concentrating attention to the program. Thus, the communication terminal can be used with a higher degree of convenience. In addition, the phone-conversation partner is informed of a particular time after which a phone call will be accepted. Thus, it is no longer necessary for the phone-conversation partner to make a phone call several times before the particular time. As a result, troublesomeness can be eliminated. In addition, since a phone call can be made right after the video reproduction is ended, the phone-conversation partner can contact the user at the end of the video reproduction.

Note that it is desirable to provide a feature allowing the user to determine whether the phone-conversation partner is to be notified of the end of video reproduction by using a response message in the sequence of operations shown in Fig. 2 or an email in the sequence of operations shown in Fig. 3. For example, it is desirable to allow the user to select either a response message or an email in an operation to set incoming-reporting conditions.

In this way, the phone-conversation partner can be notified of the end of video reproduction by adoption of a technique desired by the user. Thus, the communication terminal can be used with a higher degree of convenience.

Next, a method of setting incoming-reporting conditions is explained by referring to Fig. 4.

Fig. 4 is a diagram showing a typical table typically summarizing concrete incoming-reporting conditions. The table of incoming-reporting conditions is stored in the storage unit 15 as described above.

Each record of the table of incoming-reporting conditions comprises a sequence number 401, a video priority mode 402 and criteria 403. The sequence number 401 is a number indicating an order in an operation to search the table of incoming-reporting conditions for a record. When an incoming is received in the course of a video reproduction, the table of incoming-reporting conditions is searched sequentially in an order indicated by the sequence numbers 401 starting from the number 1 for a record corresponding to the incoming. The video priority mode 402 is used for storing information, which can be ON or OFF. With the video priority mode 402 set at ON in a record found in a sequential search carried out in an order

indicated by the sequence numbers 401 on the table of incoming-reporting conditions, the video reproduction takes precedence of the operation to report an incoming to the user without regard to the importance of the phone-conversation partner and the importance of the image being reproduced. With the video priority mode 402 set at OFF in a record found in a sequential search carried out in an order indicated by the sequence numbers 401 on the table of incoming-reporting conditions, on the other hand, the criteria 403 of the record are examined to determine whether the video reproduction takes precedence of the operation to report an incoming to the user or the operation to report an incoming takes precedence of the video reproduction. Examples of the incoming-reporting condition include information such as "The partner making the phone call is a person named A," "The name of the program being watched presently is B," "The email sender is a person named C" and "The time period is 18:00 to 7:00."

It is to be noted that there are 3 types of criterion for each record. The number of criteria per record is arbitrary as long as there are more than one criterion in one record. In addition, as criteria, it is possible to set a variety of conditions such as a

reproduction date, a reproduction day of the week, a

reproduction period of time, information on the position of

the communication terminal 10, the movement speed of the

communication terminal 10, the amount of electric charge

remaining in the battery, video attributes, attributes of

the telephone-conversation partner and attributes of the

program.

As described above, the table of incoming-reporting

conditions is used for setting a variety of conditions. In

this way, the user is allowed to set incoming-reporting

conditions desired by the user.

By referring to the flowchart shown in Fig. 5, the

following description explains the procedure executed at

the steps S203 and S303 to determine the value of the

priority mode.

(1) First of all, at the first step S501, the value of the

sequence number i showing the order of the operation to

search the table of incoming-reporting conditions for a

record is set at 1 corresponding to the first non-default

record in the table.

(2) Then, at the next step S502, the sequence number i is

examined to determine whether or not the sequence number i

is valid, that is, to determine whether or not the sequence

number i points to a record in the table of incoming-reporting conditions. If the determination result obtained at the step S502 is YES meaning that the sequence number i is valid, the flow of the procedure goes on to a step S503.

If the determination result obtained at the step S502 is NO meaning that the sequence number i is invalid, on the other hand, the flow of the procedure goes on to a step S509 at which a default priority mode is read out from the table of incoming-reporting conditions and the execution of the procedure is ended. In the typical table shown in Fig. 4 as the table of incoming-reporting conditions, the value of the video priority mode 402 in a record pointed to by the sequence number * is the default priority mode. Thus, in this case, an ON value of the video priority mode 402 is read out from the table of incoming-reporting conditions and the video reproduction takes precedence of the operation to report an incoming to the user.

(3) If the sequence number i is determined to be a valid sequence number, the flow of the procedure goes on to a step S504 by way of the step S503 at which a record pointed to by the sequence number i is referred to.

(4) At the step S504, the record is examined to determine

whether or not criterion 1 is satisfied. If the
determination result obtained at the step S504 is YES
meaning that criterion 1 is satisfied, the flow of the
procedure goes on to a step S505. If the determination
result obtained at the step S504 is NO meaning that
criterion 1 is not satisfied, on the other hand, the flow
of the procedure goes on to a step S507 at which the
sequence number i is incremented by 1. Then, the flow of
the procedure goes back to the step S502.

As an example, the following description explains
the criterion of a record included in the incoming-
reporting condition table shown in Fig. 4 as a record
pointed to by the sequence number 1. Criterion 1 in the
record pointed to by the sequence number 1 states: "The
partner making the phone call is a person named A." Thus,
if the phone-conversation partner of the voice incoming is
a person named A, criterion 1 is satisfied. In this case,
the flow of the procedure goes on to the step S505. If the
phone-conversation partner of the voice incoming is not a
person named A, on the other hand, criterion 1 is not
satisfied. In this case, the flow of the procedure goes on
to the step S507 at which the sequence number i is
incremented by 1. Then, the flow of the procedure goes

back to the step S502.

(5) If criterion 1 is determined to be a satisfied

condition, the flow of the procedure goes on to a step S505

to determine whether or not the record includes criterion 2

and, if the record includes criterion 2, determine whether

or not criterion condition 2 is satisfied. If the

determination result obtained at the step S505 is YES

meaning that criterion 2 is not described in the record or

criterion 2 is satisfied, the flow of the procedure goes on

to a step S506.

If the determination result obtained at the step

S505 is NO meaning that criterion 2 described in the record

is not satisfied, on the other hand, the flow of the

procedure goes on to the step S507 at which the sequence

number i is incremented by 1. Then, the flow of the

procedure goes back to the step S502.

Criterion 2 is not described in a record included in

the incoming-reporting condition table shown in Fig. 4 as

the record pointed to by the sequence number 1. Thus, in

this case, the flow of the procedure goes on to the step

S506.

(6) If the record does not include criterion 2, the non-

existence of criterion 2 is interpreted as satisfied

criterion 2. In this case, the flow of the procedure goes on to the step S506 as described above to determine whether or not the record includes criterion 3 and, if the record includes criterion 3, determine whether or not criterion condition 3 is satisfied. If the determination result obtained at the step S506 is YES meaning that criterion 3 is not described in the record or if criterion 3 is satisfied, the flow of the procedure goes on to a step S508.

If the determination result obtained at the step S506 is NO meaning that criterion 3 described in the record is not satisfied, on the other hand, the flow of the procedure goes on to the step S507 at which the sequence number i is incremented by 1. Then, the flow of the procedure goes back to the step S502.

Criterion 3 is not described in a record included in the incoming-reporting condition table shown in Fig. 4 as the record pointed to by the sequence number 1. Thus, in this case, the flow of the procedure goes on to the step S508.

(7) If the record does not include criterion 3, the non-existence of criterion 3 is interpreted as satisfied criterion 3. In this case, the flow of the procedure goes on to the step S508 at which the video priority mode of the

record pointed to by the sequence number i is read out from the table of incoming-reporting conditions.

In the case of the sequence number 1 for the incoming-reporting condition table shown in Fig. 4, as a result of the operations carried out the steps S502 to S507, the flow of the procedure goes on to the step S508 if the phone-conversation partner is a person named A, or goes on to a step S509 if the phone-conversation partner is not a person named A. That is to say, if the phone-conversation partner is a person named A, the OFF value of the video priority mode is read out from the record pointed to by the sequence number 1. In this case, the incoming is reported to the user. If the phone-conversation partner is not a person named A, on the other hand, the ON default value of the video priority mode is read out from the record pointed to by the sequence number *. In this case, the video reproduction takes precedence of the operation to report an incoming to the user. Thus, the incoming is not reported to the user.

By the same token, in the case of the sequence number 2, an incoming is reported to the user if the program being watched is program B and not reported to the user if the program being watched is not program B. As for

the sequence number 3, an incoming is reported to the user if the email sender is a person named C and the incoming is received in a time period of 18:00 to 7:00. Otherwise, the incoming is not reported to the user. As for the sequence number 4, an incoming is reported to the user if the phone-conversation partner is a person named D, the program being watched is program E and the incoming is received in a time period of 20:00 to 22:00. Otherwise, the incoming is not reported to the user.

As described above, criteria are examined sequentially from sequence number i to another in order to determine whether or not the criteria described in a record pointed to by a sequence number i are satisfied. If all the criteria described in a record pointed to by a sequence number i are satisfied, the value of the video priority mode is read out from the record pointed to by the sequence number i. The value read out from the record is then used as a basis for determining whether the video reproduction takes precedence of the operation to report an incoming to the user or the operation to report an incoming takes precedence of the video reproduction. If all the criteria described in every record are not satisfied, on the other hand, the default value of the video reproduction mode is

used. In the case of the typical default value set in the

table of incoming-reporting conditions, the video

reproduction is continued without reporting the incoming to

the user.

In accordance with the incoming-reporting condition

table shown in Fig. 4 and the procedure represented by the

flowchart shown in Fig. 5, a non-default value of the video

priority mode is read out from a record identified by a

sequence number only if, for the record, criterion 1 is

satisfied AND criterion 2 is satisfied AND criterion 3 is

satisfied, that is, a logic expression of Criterion 1 *

Criterion 2 * Criterion 3 has a true Boolean value.

However, a non-default value of the video priority mode can

also be read out from a record only if, for the record,

criterion 1 is satisfied OR criterion 2 is satisfied OR

criterion 3 is satisfied. As another alternative, a non-

default value of the video priority mode is read out from a

record only if, for the record, criterion 1 is NOT

satisfied AND/OR criterion 2 is NOT satisfied AND/OR

criterion 3 is NOT satisfied. In addition, in accordance

with the incoming-reporting condition table shown in Fig. 4

and the procedure represented by the flowchart shown in Fig.

5, only 3 criteria are prescribed. However, the present

invention is not limited to the configuration prescribing

only 3 criteria. Also in accordance with the incoming-

reporting condition table shown in Fig. 4 and the procedure

represented by the flowchart shown in Fig. 5, the default

value of the video priority mode is set at ON. However,

the default value of the video priority mode can also be

set at OFF.

Another table of incoming-reporting conditions is

explained by referring to Fig. 8 as follows. Fig. 8 is a

diagram showing a second typical incoming-reporting

condition table, which is obtained by extending the typical

incoming-reporting condition table shown in Fig. 4. The

incoming-reporting condition table shown in Fig. 8 is

different from the incoming-reporting condition table shown

in Fig. 4 in that, in the case of the incoming-reporting

condition table shown in Fig. 8, the sequence number has a

value in the range 1 to 5, the maximum number of criteria

per record is 5 and a column of a criterion logic

expression is added to the table.

Much like the incoming-reporting condition table

shown in Fig. 4, if "The partner making the phone call is a

person named A" stated by criterion 1 in the record pointed

to by the sequence number 1 is satisfied, the value of the

video priority mode is OFF meaning that the operation to report an incoming to the user takes precedence of the video reproduction.

The record pointed to by the sequence number 2 includes criterion 1 stating: "Sunday" and criterion 2 stating: "20:00 - 22:00." Combined by a criterion logic expression of (Criterion 1) * (Criterion 2), these criteria are set on the assumption that known people make a large number of phone calls on Sundays during the time period 20:00 to 22:00. The communication terminal 10 can thus be used in such a way that an operation to report arrivals of such phone calls to the user takes precedence of a video reproduction.

The record pointed to by the sequence number 3 includes criterion 1 stating: "08:45 - 17:15," criterion 2 stating: "Weekday" and criterion 3 stating: "12:00 - 12:45". Combined by a criterion logic expression of (Criterion 1) * (Criterion 2) # (Criterion 3), these criteria are set in order to use the communication terminal 10 in such a way that an incoming is reported to the user during business hours from 08:45 to 17:15 on any weekday by taking precedence of a video reproduction except during a lunch time from 12:00 to 12:45.

The record pointed to by the sequence number 4 includes criterion 1 stating: "Moving," criterion 2 stating: "Weekday," criterion 3 stating: "07:45 - 08:30," criterion 4 stating: "21:00 - 22:00" and criterion 5 stating: "The partner making the phone call is a person named B." Combined by a criterion logic expression of (Criterion 1) * (Criterion 2) * {(Criterion 3) + (Criterion 4)} # (Criterion 5), these criteria are set on the assumption that, during the time period 07:45 - 08:30 on a weekday, the user is on the way to the office, being on board of a public transport facility and, during the time period 21:00 - 22:00 on a weekday, the user is on the way home, also being on board of a public transport facility. The communication terminal 10 can thus be used in such a way that a video reproduction takes precedence of an operation to report the arrival of a phone call to the user if the phone call is received when the user is in motion on the aforementioned way to the office or the aforementioned way home on a weekday except that the phone call is made by a phone-conversation person named B. That is to say, in the case of a phone call made only by a phone-conversation person named B, the user must display a sense of urgency to answer the telephone. In this case, the arrival of such a

phone call is reported to the user, taking precedence of a video reproduction.

The record pointed to by the sequence number 5 includes criterion 1 stating: "Watching already recorded video," criterion 2 stating: "The present position is home" and criterion 3 stating: "Variety program." Combined by a criterion logic expression of (Criterion 1) + (Criterion 2) + (Criterion 3), these criteria are set in order to use the communication terminal 10 in such a way that the arrival of an incoming that is received while the user is watching an already recorded video, the user is at home or the user is watching a variety TV program is reported to the user, taking precedence of the video reproduction. This is because the seeing and hearing of an already recorded video can be resumed later and, if the user is at home at the present time, the current program can be watched from the TV set at home. As for a variety TV program, the arrival of such an incoming is reported to the user because a variety TV program is not considered to be a program of much importance to the user.

It is to be noted that broadcasted data of a digital broadcast and data acquired by using an EPG function includes various kinds of information. For example, the

information includes not only the aforementioned start and end times of a program, but also channels, program names, program attributes, film starts and talents performing in programs and commentaries on contents of programs. The program attributes include a news program, a variety program, a movie and a drama. By using the information in criteria, a variety of criteria can be set and the communication terminal 10 can hence be used with a high degree of convenience. The control unit 14 fetches the information from broadcasted data of a digital broadcast and data acquired by using an EPG function or, as an alternative, the information can also be acquired by using a dedicated line.

By referring to Figs. 12 to 15, the following description explains a concrete technique adopted by the user to set incoming-reporting conditions included in the table shown in Fig. 8. The incoming-reporting conditions are set by entering a sequence number, a video priority mode, criteria and a criterion logic expression for each record of the table of incoming-reporting conditions through the key input unit 16. In operations to enter a sequence number, a video priority mode, criteria and a criterion logic expression for each record, it is desirable

to specify the sequence number of the record to be followed
by the video priority mode, criterion 1, criterion 2, ---
criterion 5 and the criterion logic expression, which are
associated with the sequence number.

Fig. 12 is a diagram of a screen showing a state in
which the user has entered the number 1 as the sequence
number and the value OFF as the video priority mode and is
about to enter a value of criterion 1. The item criterion
1 on the screen is in a state of being selected. In a
state of being selected, the colors of the characters and
background of the item are inverted into colors different
from the rest.

As an OK button of the screen shown in Fig. 12 is
pressed with the item criterion 1 selected, a screen shown
in Fig. 13 is displayed on the display unit 17. Fig. 13 is
a diagram of a screen showing a list of sub-items for item
criterion 1. The sub-items to be selected by the user
include the phone-conversation partner and the program. In
this example, the user has selected the sub-item date/time,
day of the week and time period of the program.

As an OK button of the screen shown in Fig. 13 is
pressed with the sub-item date/time, day of the week and
time period of the program selected, a screen shown in Fig.

14 is displayed. Fig. 14 is a diagram of screen showing details of the sub-item date/time, day of the week and time period of the program. The details to be selected by the user include the date/time, the day of the week and the time period. In this example, the user has selected the day of the week.

As an OK button of the screen shown in Fig. 14 is pressed with the day of the week selected, a screen shown in Fig. 15 is displayed. Fig. 15 is a diagram of screen showing the days of the week and a holiday to be selected by the user. The days of the week range from Monday to Sunday. In this example, the user has selected Thursday.

As an OK button of the screen shown in Fig. 15 is pressed with Thursday selected, Thursday is confirmed. That is to say, in the table of incoming-reporting conditions, Thursday is set as criterion 1. Thus, an incoming received on a Thursday is reported to the user, taking precedence of a video reproduction because the video priority mode is set at the OFF value as described above.

It is to be noted that, as described above, the user sets incoming-reporting conditions by itself. However, implementations of the present invention are not limited to this configuration. It is also possible to provide such a

configuration of the table of incoming-reporting conditions
that, for example, a first arrival of an incoming received
from a telephone-conversation partner named B in the course
of watching program A is always reported to the user.
However, a query stating: "YES/NO" is also displayed to ask
the user a question as to whether or not to report the
second or subsequent arrivals of the incoming received
under the same conditions as the first arrival to the user.
If the user selects the YES option, automatically, second
and subsequent arrivals of an incoming received from a
telephone-conversation partner named B in the course of
watching program A are reported to the user. If the user
selects the NO option, on the other hand, automatically,
such arrivals are not reported to the user. In this way,
the user does not have to set the incoming-reporting
conditions for the second or subsequent arrivals of the
incoming received under the same conditions as the first
arrival by itself. It is thus possible to eliminate the
labor and time for setting such incoming-reporting
conditions. As a result, the complexity of the setting
operations can be reduced.

In the configuration described above, only two
criteria, i. e., "The partner making the phone call is a

person named A" and "The name of the program being watched presently is B." However, it is also possible to provide a configuration in which one criterion or three or more criteria are set.

In addition, it is also possible to provide a configuration in which a telephone-conversation partner making a phone call a large number of times is regarded as a partner of importance to the user and, for incomings from this partner, the operation to report an incoming automatically to the user takes precedence of a video reproduction. It is also possible to provide another configuration in which a program watched everyday or every week is regarded as an important program and the video reproduction of such a program automatically takes precedence of the operation to report an incoming to the user. It is thus possible to set incoming-reporting conditions suitable for a situation in which the communication terminal is used.